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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,564	09/15/2003	Kyoichi Suguro	03180.0333	8012

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EXAMINER	
COLEMAN, WILLIAM D	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 03/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/661,564	SUGURO ET AL.	
	Examiner	Art Unit	
	W. David Coleman	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-12,14-17,19-23,26-31,33 and 34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-12,14-17,19-23,26-31,33 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

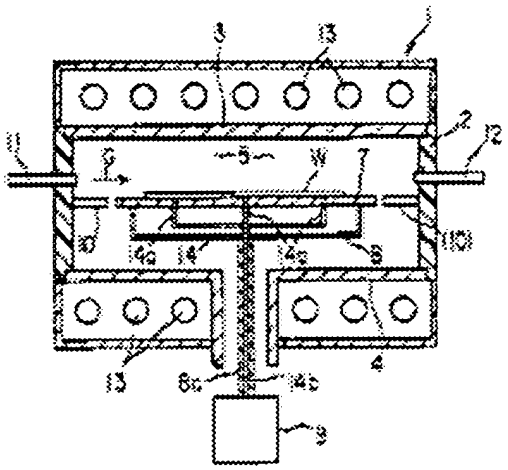
1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 12, 2005 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al., Japanese Patent Abstracts Publication No: 08-048595 in view of Timans et al., U.S. Patent Application Publication No.: US2004/0149715 A1.



4. Pertaining to claim 1, Suzuki teaches an annealing furnace, comprising:

a processing chamber **1** configured to store a substrate **W**;

a susceptor **7** located in the processing chamber so as to load the substrate and having an auxiliary heater for heating the substrate at 650 °C or less [0017], the susceptor having a surface being made of quartz;

a gas supply system (not shown) having a variety of gas sources (provided in Timans at paragraphs 0163, 0165 and 0167) required for a thermal processing on the substrate in parallel to a surface of the substrate;

an introduction conduit 11 connected to the gas supply system configured to supply the gas in parallel to the surface of the substrate;

an exhaust conduit **12** facing the introduction conduit configured to exhaust the gas form the processing chamber;

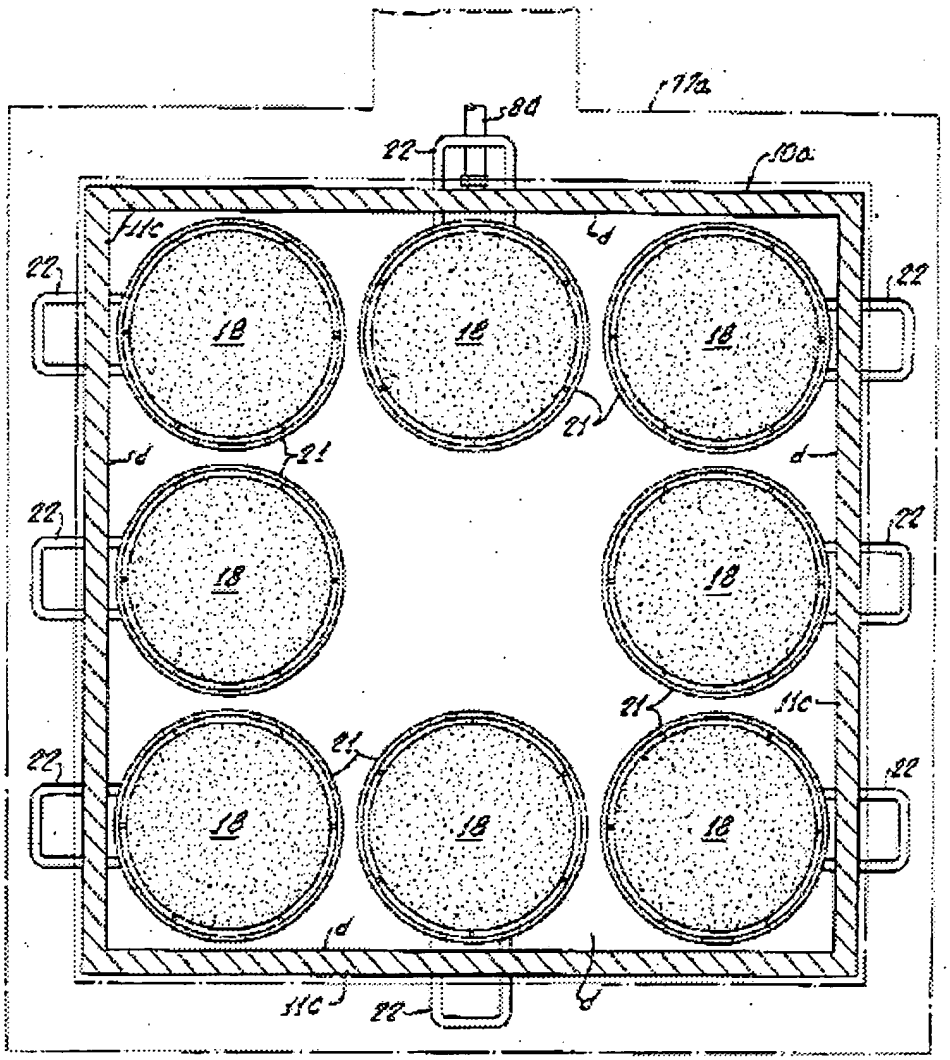
a protective member made of quartz configured to prevent oxidation or corrosion on side and bottom inner walls in the processing chamber

a transparent window located on an upper part of the processing chamber facing the susceptor; and a main heater **13** configured to irradiate a pulsed light (column 1, lines 18-20) on the surface of the substrate to heat the substrate from the transparent window. However, Suzuki fails to teach the pulsed light having a pulse duration of approximately 0.1 ms to 200 ms. Timans teaches a pulsed light having a pulse duration of approximately 0.1 ms to 200ms. (column 4, line 4, which is within the claimed range) and having a plurality of emission wavelengths (i.e., spectrum, column 3, line 62) and the gas sources including one of a reduction gas and a gas containing halogen for removing a native oxide film formed on the substrate. Timans also teaches the gas sources including one of a reduction gas and a gas containing halogen for removing a native oxide film formed on the substrate (see paragraph [0169] for surface preparation of a wafer, it is well known that halogen bearing species will remove a native oxide and/or clean the surface of the wafer) In view of Timans, it would have been obvious to one of ordinary skill in the art to incorporate the features of Timans into the Suzuki semiconductor annealing furnace because heat is applied in a controllable way (see Abstract).

5. Pertaining to claim 2, Timans teaches the annealing furnace of claim 1, wherein the main heater is one of a flash lamp and a laser unit having a plurality of laser sources for irradiating with a light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2 [0029].

6. Pertaining to claim 3, Timans teaches the annealing furnace of claim 1, wherein the gas supply system supplies at least one of an oxidation gas and a nitridation gas for forming an

insulating film on the substrate (this limitation is shown in Sheets, U.S. Patent 4,698,486, which is incorporated by reference, **FIG. 7**, discloses a pipe **84**, which supplies oxygen or nitrogen, see claim 36 of Sheets, also see Wang paragraph 0165 and 0166).



7. Pertaining to claim 4, Timans teaches the annealing furnace of claim 1, wherein the emission wavelengths include ultraviolet components (it is well known that an excimer laser emits in the ultraviolet range [0025]).

8. Pertaining to claim 5, Timans teaches the annealing furnace of claim 3 , wherein the gas supply system supplies one of the oxidation gas and the nitridation gas after removing the native oxide film formed on the substrate (please see the explanation in the rejection of claim 1 above) [0169].

9. Pertaining to claim 6, Suzuki in view of Timans teaches a manufacturing apparatus, comprising:

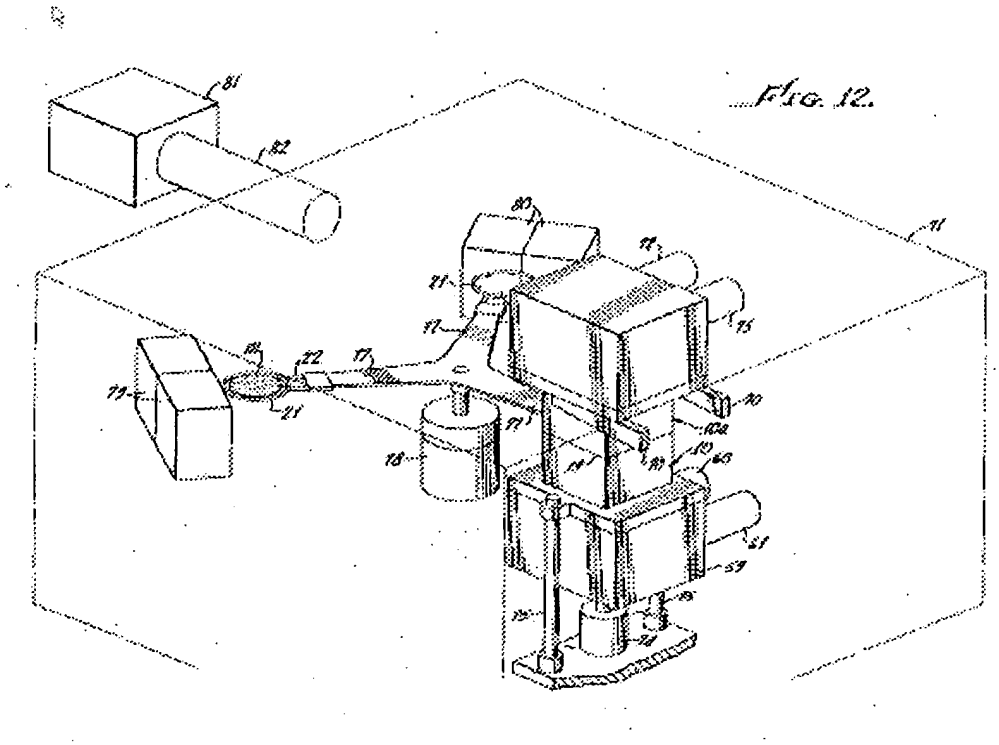
a first cassette chamber to place a wafer cassette for storing a substrate;

a transfer chamber connected to the first cassette chamber, having a transfer robot for transferring the substrate;

a first processing apparatus having a first processing chamber connected to the transfer chamber and configured to store the substrate, a first susceptor located in the first processing chamber so as to load the substrate transferred by the transfer robot, a first introduction conduit supplying a first gas in parallel to a surface of the substrate, the first gas including one of a reduction gas and a gas including halogen for removing a native oxide film formed on the substrate, a first exhaust conduit facing the introduction conduit so as to exhaust the first gas from the processing chamber, a protective member made of quartz configured to prevent oxidation or corrosion on side and bottom inner walls in the first processing chamber, a first

transparent window located on an upper part of the first processing chamber, and a first main heater irradiating a pulsed light on the surface of the substrate to heat the substrate from the first transparent window. Timans the pulsed light having a duration of approximately 0.1 ms to 200 ms and having a plurality of emission wavelengths; and

a second cassette chamber to place another wafer cassette storing the substrate transferred from the first processing apparatus by the transfer robot (see FIG. 12 of Sheets).



10. Pertaining to claim 7, Suzuki in view of Timans teaches the manufacturing apparatus of claim 6, wherein the first main heater irradiates with a light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2.

11. Pertaining to claim 9, the combined teachings teaches the manufacturing apparatus of claim 6, further comprising:

a second processing apparatus having a second processing chamber connected to the transfer chamber and configured to store the substrate, a second susceptor located in the second processing chamber so as to load the substrate transferred by the transfer robot, a second introduction conduit supplying a second gas to the surface of the substrate, a second transparent window located on an upper part of the second processing chamber, and a second main heater irradiating a light on the surface of the substrate to heat the substrate from the second transparent window and having a plurality of emission wavelengths.

12. Pertaining to claim 10, the combined teachings teach the manufacturing apparatus of claim 9, wherein the second main heater irradiates the light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2.

13. Pertaining to claim 11, the combined teachings teach the manufacturing apparatus of claim 9, wherein the second introduction conduit supplies at least one of an oxidation gas and a nitridation gas for forming an insulating film on the substrate (with respect to this limitation, the Examiner takes the position that it is well known to provide multiple conduit supplies to process chambers to reduce cross-contamination of the gas supplies).

14. Pertaining to claim 12, the combined teachings teach the manufacturing apparatus of claim 6 , wherein the emission wavelengths of the first main heater include ultraviolet components.

15. Pertaining to claim 14, Suzuki in view of Timans teaches an annealing method, comprising:

introducing at least one of an oxidation gas and a nitridation gas to a substrate loaded on a susceptor in a processing chamber from an introduction conduit to an exhaust conduit, the introduction conduit and the exhaust conduit each connected to a top portion of sidewalls in the processing chamber and facing each other, after a pretreatment of removing a native oxide film on the surface of the substrate by supplying one of a reduction gas and a gas including halogen; and

heating the surface of the substrate with a pulse duration of approximately 0.1 ms to 200 ms to perform at least one of oxidation and nitridation.

16. Pertaining to claim 15, the combined teachings teach the annealing method of claim 14, wherein the heating is performed by irradiation of a light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2.

17. Pertaining to claim 16, the combined teachings teach the annealing method of claim 15, wherein the irradiation of the light is performed for a plurality of times.

18. Pertaining to claim 17, the combined teachings teach the annealing method of claim 15, wherein emission wavelengths of the light includes ultraviolet components.

19. Pertaining to claim 19, the combined teachings teach the annealing method of claim 14, wherein the surface of the substrate is heated to a temperature range of approximately 350 °C to 1200 °C when measured by a pyrometer [0027].

20. Pertaining to claim 20, the combined teachings teach the annealing method of claim 14 , wherein the heating is selectively performed by aligning a stencil mask having an opening on an upper side of the substrate (because Wang also discloses forming silicide contacts with the claimed apparatus, it is well known to provide a stencil having openings to form the silicide contacts [0171]).

21. Pertaining to claim 21, the combined teachings teach the annealing method of claim 14 , wherein the heating is performed by doping one of halogen, oxygen and nitrogen to a portion of the substrate.

22. Pertaining to claim 22, Suzuki in view of Timans teaches a manufacturing method of an electronic device, comprising:

cleaning a substrate by a wet processing (RCA cleaning is well known in the art and cleaning a semiconductor substrate prior to a fabrication step is well known);

loading the substrate on a first susceptor in a first processing apparatus;

introducing a first gas in parallel to a surface of the substrate loaded on the first susceptor from an introduction conduit to an exhaust conduit, the introduction conduit and the exhaust conduit each connected to a top portion of sidewalls in the processing chamber and facing each other; and

performing a first processing by heating a surface of the substrate with a pulse duration of approximately 0.1 ms to 200 ms, the first processing removing a native oxide film on the substrate by use of one of a reduction gas and a gas containing halogen as the first gas.

23. Pertaining to claim 23, the combined teachings teach the manufacturing method of claim 22, wherein the heating of the first processing is performed by irradiating a first light having an irradiation energy density of approximately 5 J/cm^2 to 100 J/cm^2.

24. Pertaining to claim 26, the combined teachings teach the manufacturing method of claim 22, wherein the surface of the substrate is heated to a temperature range of approximately 900 °C to 1200 °C when measured by a pyrometer.

25. Pertaining to claim 27, the combined teachings teach the manufacturing method of claim 22, further comprising:

loading the substrate, which has been subjected to the first processing, on a second susceptor in a second processing apparatus;

introducing a second gas to the substrate loaded on the second susceptor; and performing a second processing by heating the surface

of the substrate (please note that the Examiner takes the position that since another chamber is used in the fabrication process, i.e., ion implantation, the annealing chamber is used to activate the dopants and/or grow oxides/nitrides).

26. Pertaining to claim 28, the combined teachings teach the manufacturing method of claim 27, wherein the heating of the second processing is performed by irradiating a second light with a pulse duration of approximately 0.1 ms to 200 ms having an irradiation energy density of approximately 5 J/cm^2 to 100 J/cm^2.

27. Pertaining to claim 29, the combined teachings teach the manufacturing method of claim 27, wherein the second processing is to form a second insulating film by use of at least any one of an oxidation gas and a nitridation gas as the second gas.

28. Pertaining to claim 30, the combined teachings teach the manufacturing method of claim 28, wherein the irradiation of the second light is performed a plurality of times.

29. Pertaining to claim 31, the combined teachings teach the manufacturing method of claim 23, wherein emission wavelengths of the first light include ultraviolet components.

30. Pertaining to claim 33, the combined teachings teach the manufacturing method of claim 27, wherein the surface of the substrate on the second susceptor is heated by an irradiation of a second light to a temperature range of approximately 950 °C to 1200 °C when measured by a pyrometer.

31. Pertaining to claim 34, the combined teachings teach the manufacturing method of claim 32, wherein the heating of the second thermal processing is performed by the irradiation from a main heater having a plurality of emission wavelengths.

Drawings

32. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the second susceptor as claimed in claim 33 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

33. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Conclusion

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.

35. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

36. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

W. David Coleman
Primary Examiner
Art Unit 2823

WDC